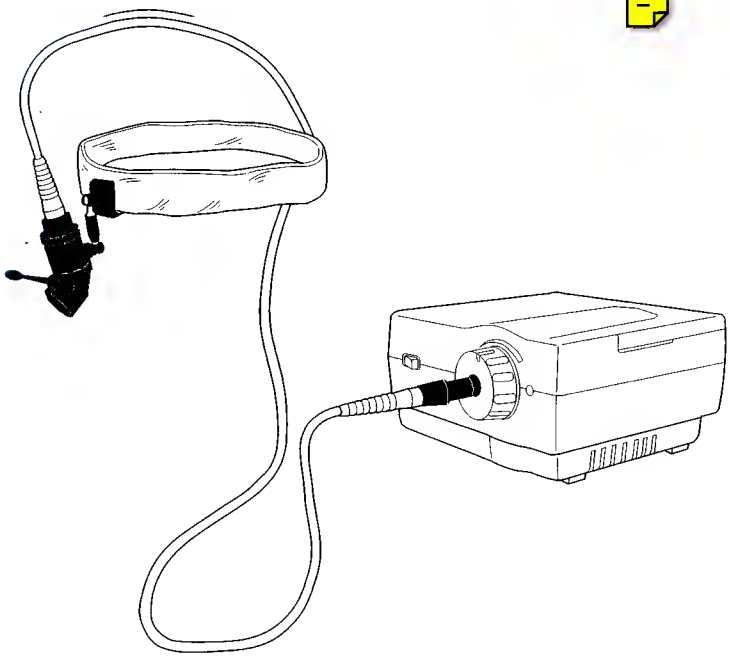
Welch Allyn Single Fiber Illumination Headlight System

Headlights
Operation Manual

Service Manual



Models: 49600,49602,49604,49606,
47100,47102,47104,47106

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Welch Allyn™

P/N 496144 Rev A.

Revision (History) Page

Rev.	Description of Change	ECN #	Date	Initial
A	New Release	5-34455	1/14/97	JJ/MD

To Service Personnel:

The information in this manual is subject to change without notice and should not be construed as a commitment by Welch Allyn, Inc.

Welch Allyn assumes no responsibility for any errors that may appear in this manual. If the product and/or its operation varies significantly from any description herein, please contact the Welch Allyn Product Service Department at 4341 State Street Road, Skaneateles Falls, New York 13153-0220, 1 800 669-9771, (315) 685-4445

This product has been designed to provide a high degree of safety and reliability. However, we can not guarantee against the deterioration of components due to aging and normal wear.

All service and repairs must be performed by authorized Welch Allyn personnel or agents, using Welch Allyn replacement parts. Failure to do so will invalidate the product warranty.

Authorized service centers should refer to repair specification for proper test and device history record requirements.

Please refer to the product warranty for specific coverage.

Welch Allyn™

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Note that the drawings contained within this manual are for reference only. Consult factory for specific drawing and revision level.

General Information

Introduction

Basic System Description

Model # 49601 is a medical light source which is used in conjunction with the Welch Allyn SFI Headlight Luminaire model 49610. The headlight is a lightweight fiber optic system that provides a bright white light through the use of Arc Lamp technology.

49600....Welch Allyn Light Source
100-240 VAC
50/60 Hz
U.S.A. Plug Type

49602...Welch Allyn Light Source
100-240 VAC
50/60 Hz
European Plug Type

49604...Welch Allyn Light Source
100-240 VAC
50/60 Hz
U.K. Plug Type

49606...Welch Allyn Light Source
100-240 VAC
50/60 Hz
Australian Plug Type

Specifications

Power Supply

100-240 VAC, 50-60 Hz, Universal input
Power Consumption 40 Watts Max.
Leakage Current: Less than 100 microamps

Light Source Dimensions

WxLxH = 4.5in (11.43cm) x 6.5in (16.5cm) x 2.5in (6.35cm)

Light Source Weight

Under 5 pounds (2.25 Kilograms)

Illumination System

Proprietary Arc Lamp
Color temperature: 5500°K
Lamp: 60 Volts, 24 Watts
Lamp Life: 200 hours minimum when employed in a 45 minutes on / 15 minutes off duty cycle. Average lamp life decreases when shorter duty times are employed.

Dimming System

Manual Shutter: 20% to 100% full output

Fiber Optic Cable Interface

Welch Allyn proprietary connector

Approvals

UL 2601-1
CSA C22.2 no. 601.1-M90
IEC 601-1
Australia AS3200
IEC 801-2,3,4,5
EN 55011
IEC 601-1-2

Light Spot Diameter at 16in (40cm) Distance

Minimum: .75in (20mm)
Maximum: 3.0in (75mm)

Environment

Operating: 60°F to 85°F
Storage: -13°F to 140°F

Equipment Classification

Light Source: Type B
Luminaire: Type BF

Fuses

T1.0A L250V (1.0Amp., 250V, time lag (Slow-Blow), Low breaking capacity)

Section 2

Service

Intent of Manual

The purpose of this manual is to provide Welch Allyn Inc. authorized service representatives with systematic guidelines for preventative maintenance, problem identification, and service of the Welch Allyn Single Fiber Headlight System. We have included the theory of operation schematic diagrams, simplified drawings, service tips and procedures to assist a trained service representative with board-level repairs. Should you encounter problems that are beyond the scope of this manual, please contact the Technical Service Department of Welch Allyn's Medical Products for assistance.

Required Tools for Service

1. 3/8" Nut Driver
2. Screwdriver(s): Phillips #1, Phillips #2
3. Screwdriver: Flat Blade #4
4. Long Nose Pliers
5. Wire Cutters Xcelite 54CG

Required Equipment:

1. Digital Volt/Ohm Meter with Leads (True RMS). Beckman model 310 or equivalent.
2. Soldering Iron
3. Solder Sucker or Desoldering Wick
4. Kepco Model MSK 10-10M Power Supply. Capable of 10 amps at 10VDC.
5. Hy-Pot Tester- Associated Research Inc. Model 35400D or Equivalent.

Words of Caution:

High Voltage

Use caution when servicing. When servicing the unit, potentially dangerous high voltage levels are exposed. Disconnect the power cord whenever possible to avoid electric shock.

Static Electricity (ESD)

Adhere to standard ESD practices at all times when servicing this equipment. Many of the electronic devices in this equipment are static sensitive, and may suffer catastrophic or latent failure if handled improperly.

Heat

Lamps, power supplies, and heat sinks may emit extreme amounts of heat during and after operation. Approach and handle these and other potentially hot components with caution.

Finished Parts

Handle all finished parts with care. The finish can be easily scratched or damaged from poor or improper handling.

Performance Checks

The following performance checks will help you (1) determine whether or not the system is operating properly, and (2) isolates a problem, if there is one.

System Set Up

Make sure the system is connected as follows:

1. Be sure that power is being provided by the wall outlet.
2. Be sure that the Lamp is installed properly.
3. Be sure that the cooling fan is turning when the unit is turned on.
4. The light source should produce a bright continuous white light with no flickering after a warm-up period of 5-15 seconds.

If any of these conditions do not occur, see the troubleshooting section.

Calibrations

Not Applicable

Section 3

Problem Solving

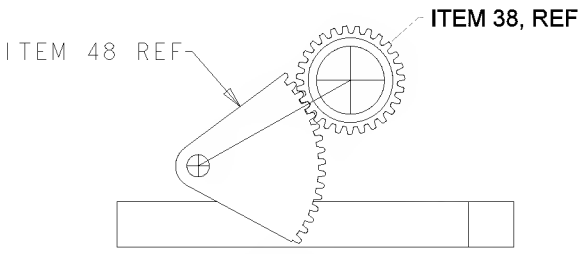
Troubleshooting

Experience shows that many service calls are due to improper operator technique and poor connections. Before taking apart the light source, make sure that setup errors are not causing the problem. **When checking voltages or signals, be sure to verify the signal through the harness wires, connectors, and on the circuit board.**

Symptom	Possible Cause	Procedure
Lamp does not illuminate, but the fan is running.	Lamp connector is out of place.	Remove lamp cover and reseat the connector.
	Lamp is blown.	Verify unit functions with a known good lamp or lamp functions with a known good unit.
	Defective ballast	Verify Voltage input and output of the Ballast board. Refer to wiring diagram. **Note: There is 1KV to 2KV present at the output during startup.**
	Defective Power supply. No +15VDC present.	Check output of power supply per wiring diagram. Replace supply if no voltage is present.

Symptom	Possible Cause	Procedure
Lamp not illuminated, fan does not function (No power is apparent).	Power line is damaged or disconnected.	Connect, repair, or replace as necessary.
	Power is not turned "ON"	Turn power on.
	Lamp Door Interlock switch is disengaged.	Verify that the lamp cover is firmly and properly in place and that interlock switch is functioning properly. Verify continuity to be sure that the switch is working properly.
	AC line fuses F1 and/or F2 are open.	Verify and replace as necessary.
	Open circuit connection.	Verify AC input through unit to the Switching Power Supply.
	Power supply circuit defective.	Verify DC output at J2 of Switching Power Supply.
	Other circuits loading down power supply.	If the fuse is blown, disconnect the plug from J2 (Output of the Switching Power Supply). Replace the blown fuse, and reapply power. Verify DC output at J2. If no voltage is present or fuse is again blown, replace Switching Power supply.
Light Source overheating	Fan Not working properly	Verify correct voltages at the input and output of the power supply *(See wiring diagram 496045)*. If all voltages are within specification, then replace motor/secondary wire harness assembly.

Symptom	Possible Cause	Procedure
Light Source over Heating Continued..	Covered or clogged air vent.	Check to see if anything is covering the air vents, or if the air filter is extremely dirty. Replace filter as described in section 4 if necessary.
	No +12VDC output from power supply to operate the fan.	Check voltage per wiring diagram. Replace power supply if no voltage is present.
No light at Luminaire, but light at light source.	Broken fiber optic cable.	Replace fiber optic cable with a know good cable.
Low light output at Luminaire.	Dirt on fiber optic light carrier.	Remove the fiber optic cable from the light source and the Luminaire, and clean both ends with alcohol and a cotton swab.
	Dirt on light reflector inside the Solarc light source.	Clean the reflector of any debris using lens paper and an optical grade methyl alcohol. **Do not use Isopropyl alcohol or cotton swabs.** If the reflector becomes scratched or pitted the entire lens platform assembly will need to be replaced.
	The shutter assy. in the light source is misaligned or not working.	Align the shutter gear as shown on view "L" below.



GEAR TIMING DETAIL VIEW L

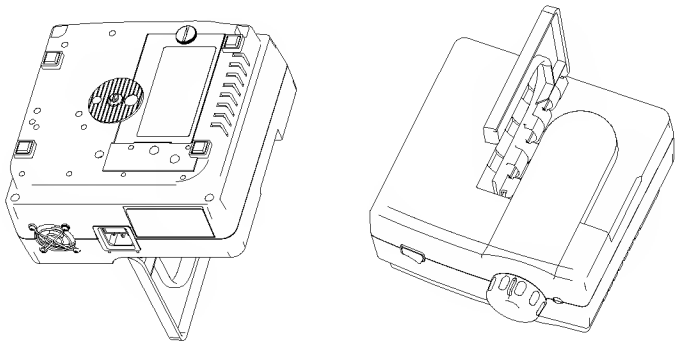
ENGAGE GEARS OF ITEMS 48 AND 38 AS SHOWN IN VIEW L WITH ITEM 35 (KNOB) ROTATED COUNTERCLOCKWISE TO THE STOP POSITION.

Section 4

Disassembly and Repair

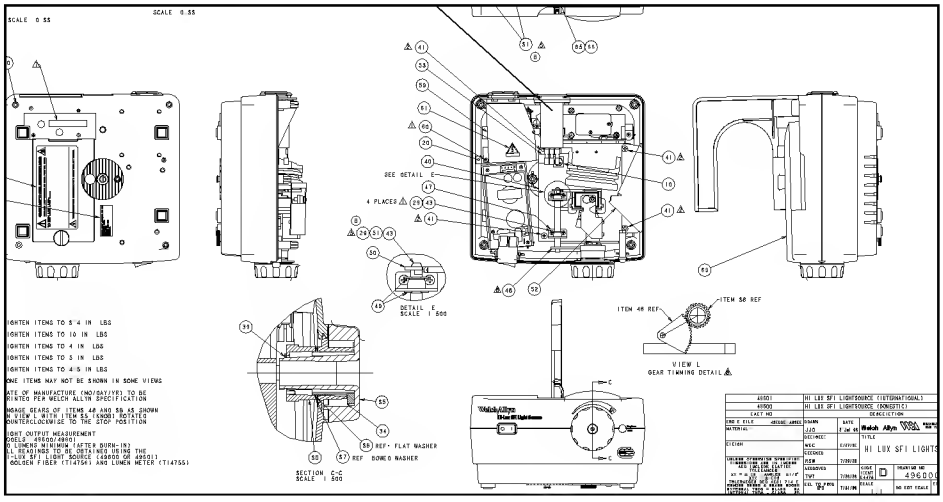
About This Section:

This section describes how to remove and replace major sub assemblies of the 49601 SFI Light Source.



Note: Refer to the "Bubble Number" on each drawing and the cross reference on the Parts List to determine the correct part number.

Part Number	Description	Bubble #	Start Up Qty
496024-501	PLATFORM PKGD	40	1
106124-25	#8 X 1.00 PLASTITE SCREW	41	10
106100-11	PHPS 4-40 X.312	43	10



Top Housing Assy Disassembly

1. Fan guard:
   ___**Remove** the top two screws (Phillips) that hold the fan guard in place.

2. Remove the Top Housing:
   ___ **Remove** the five screws (Phillips) on the bottom of the unit and lift the top housing assembly upwards.

Ballast Board Replacement

1. Top Housing:
   ___ **Remove** the top housing.

2. Fan Air Baffle:
   ___ **Remove** the two Phillips head screws holding the baffle inplace.

3. Wire Connectors:
   ___ **Unplug** the two connectors located on the ballast board.

4. Lamp Wires:
   ___ **Lift** the ballast board up, so that it is resting on top of the power supply board, and **Desolder** the black and white wires from the ballast board.

5. Reassembly:
   ___ **Reassemble** in reverse order. Be sure to reinstall the insulating material under the ballast board. The black and white wire from the lamp connector should be routed through the insulator then resoldered into the proper holes in the ballast board (refer to wiring diagram). *Take care not to over tighten the screws, for they are only screwed into plastic.*

Power Supply Replacement

1. Top Housing:
   ___ **Remove** the top housing as instructed in "Top Housing Removal" section.

2. Power Switch:
   ___ **Unplug** the connector (J1) with the brown and blue wires from the power supply, by **Pulling** straight up on the connector with a pair of needle-nose pliers

3. Secondary Output:
   ___ **Unplug** the secondary output plug (J2), by **Pulling** straight up on the connector with a pair of needle-nose pliers.

4. Grounding Wire:
   ___ **Unplug** the green and yellow ground wire that attaches to the power supply.

5. Wire Tie:
   ___ **Cut** the wire tie that holds the thermal cutout wires to the power supply chassis using a small pair of side cutters.

6. Power Supply Board:
   ___ **Unscrew** the four screws located on the four corners of the powersupply board and lift the power supply out of the bottom housing.

7. Reassembly:
   ___ **Reassemble** in reverse order. Be sure to put the insulator back into its original position. *Take care not to over tighten the screws, for they are only screwed into plastic.*

Fan / Thermal Cutout Replacement

* The fan and the thermal cutout come as part of the fan harness assembly; therefore, the entire secondary wire harness assembly must be replaced.

1. Top Housing:
   ___ **Remove** the top housing as outlined in top housing removal section.

2. Air Baffle:
   ___ **Remove** the two screws that hold the baffle in place, and **lift** the baffle out.

3. Wire Ties:
   ___ **Cut** the two wire ties that hold the wiring harness to the internal chassis.

4. Fan/Fan Guard:
   ___ **Unscrew** the remaining two screws that hold the fan to the bottom housing. Taking care to remember how the ground wire is connected and routed.

5. Thermal Cut Off Sensor:
   ___ **Remove** the screw and plastic washer holding the temperature sensor to the sensor switch bracket assembly, and remove the sensor.

6. Connectors:
   ___ **Unplug** the 5 pin connector (J2) from the Condor power supply and the 2 pin connector (P2) from the ballast board.

7. Harness:
   ___ **Remove** the Secondary Wiring Harness assembly.

8. Reassembly:
   ___ **Reassemble** in reverse order. *(Note)* A small amount of *thermal compound* (M11047) needs to be *applied to* the switch bracket, where the flat side of the new thermal switch will be installed.

Lamp Cover Safety Interlock Switch:

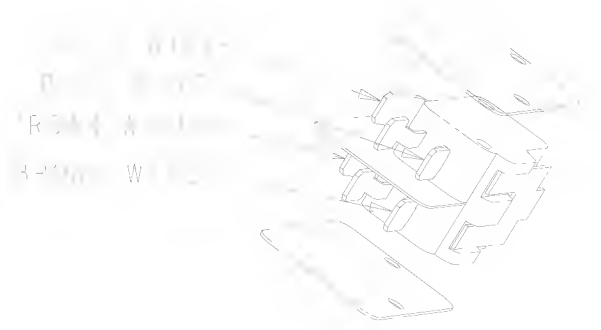
1. Top Housing:
   ___ **Remove** the top housing as outlined in top housing removal section.

2. Lamp Cover:
   ___ **Remove** the lamp cover door. The ground wire on the door does not need to be removed.

3. Safety Switch Assy:
   ___ **Unscrew** the two Phillips head screws that hold the switch assembly to the bottom housing. Keep the outside insulators.

4. Primary Wires:
   ___ **Disconnect** the primary wires from the switch, and remove the switch.

5. Reassembly:
   ___ **Reassemble** in reverse order. Make sure to reinstall the two insulators that were removed in step #1. Refer to wiring diagram 496045 for additional help.

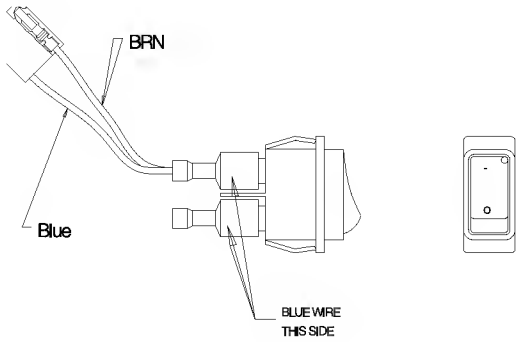


Power Switch Replacement

1. Top Housing:
   ___ **Remove** the top housing assembly as described in top housing disassembly section.

2. Power Switch removal:
   ___ **Unplug** the four quick connect terminals from the switch and **remove** defective switch.

3. Power Switch replacement:
   ___ **Reassemble** the switch to the four quick connect terminals. The switch should be set into the bottom housing with the "1" closest to the light attenuator control.

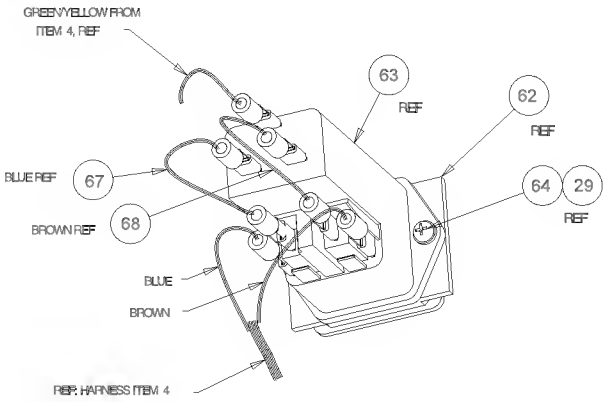


Replacement of the IEC Power Filter

1. Top Housing:
   ___ **Remove** the Top housing as described on the top housing removal nstructions.

2. IEC Line Filter:
   ___ **Loosen** the two Phillips head screws holding the IEC line filter to the bottom housing.

3. Primary Wires:
   ___ **Unplug** the brown and blue wires leading to the interlock switch from the line filter.



4. Ground Wire:
   ___ **Unplug** the Green and yellow ground wire from the IEC line filter.

5. Jumper Wires:
   ___ **Unplug** the brown and blue jumper wires and install them onto the new IEC line filter. Replace these wires if they appear to be damaged. *A fair amount of force is required to push the new wires on to the spade connectors, so use caution that the spade connector does not get bent.*

6. Reassembly :
   ___ **Reassemble** in reverse order. Refer to wiring diagram 496045 and assembly drawing 496000 for proper wire connections.

Attenuator Control:

1. Reflector platform assembly:
   ___**Remove** the reflector platform assembly as described in the Reflector Assy. section.

2. Gear (Plastic)
   ___ **Push** in on the black plastic gear and remove the "C-clip" that holds it in place by putting a flat blade screwdriver under the closed side of the clip and **prying** upwards.

3. Knob:
   ___ **Pull** the knob out of the bottom housing. The bearing will probably stay on the knob shaft. Remove the bearing and reuse it if a new knob is being installed.

4. Reassembly:
   a. ___ **Replace** any defective or worn components.

   b. ___ **Slide** the bearing into the bottom housing, so that the notch on the bottom housing aligns with the mating part on the bushing.

   c. ___ **Slide** the knob through the bearing and place the flat washer, spring washer, and black gear onto the knob shaft.

   d. ___ **Reinstall** the C-clip, by pressing the black gear and the control knob together, then inserting the c-clip into the grove on the knob shaft.

Reflector Platform Assembly

1. Lamp:
   ___ **Remove** the lamp socket assembly.

2. Lamp Wires:
   ___ **Unscrew** the two screws holding the black and white wire retainers to the bottom of the reflector platform.

3. Top Housing:
   ___ **Remove** the top housing as described in the top housing removal section.

4. Thermal Cut Out:
   ___ **Cut** the wire ties that hold the thermal cut out wires to the sensor switch bracket. **Unscrew** the Phillips screw that holds the thermal sensor in place, and lift it up and out of the way.

5 IEC Line Filter:

___ **Remove** the IEC power filter as described in IEC Power filter section.

6. Platform Air Baffle:

___ **Unscrew** the two screws holing the baffle to the platform assembly and **lift** the baffle straight up.

7. Platform Ground:

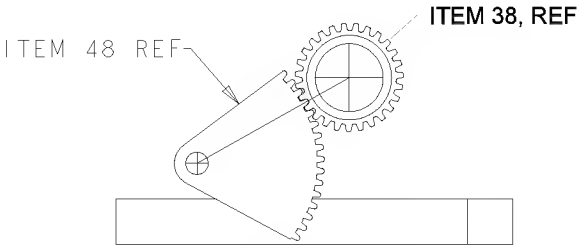
___ **Unscrew** the screw holding the ground wire to the platform assembly.

8. Platform Reflector Assembly:

___ **Unscrew** the two remaining screws holding the platform assembly to the bottom housing. **Tilt** the platform assembly and lift it out.

9. Reassembly:

___ **Reassemble** in reverse order. **Turn** the light attenuator knob fully counterclockwise, **align** the first knob gear tooth into the 3rd notch on the flag gear.



GEAR TIMING DETAIL VIEW L

ENGAGE GEARS OF ITEMS 48 AND 38 AS SHOWN IN VIEW L WITH ITEM 35 (KNOB) ROTATED COUNTERCLOCKWISE TO THE STOP POSITION.

Section

5 Maintenance

Preventative Maintenance

The purpose of preventative maintenance is to pro-actively reduce or eliminate future problems. Keeping the Light Source in good operating condition ensures that it will perform reliably and safely. Every six to twelve months, you should:

* Check power cable for wear.

* Ensure that, during use, the light source receives adequate ventilation.

* Ensure that the ball detent is still functioning properly.

Visual Inspection

Check for anything out of the ordinary. For instance:

- Does the light source make too much noise?

- Are there any loose parts inside the box?

- Is the power switch working properly?

- Do all components connect/disconnect easily?

CLEANING

Refer to Operating Manual, Welch Allyn Part Number 496027 or 496130.

Check Ground Continuity

1. Disconnect the power cord from the SFI Light Source.

2. Verify the impedance between the ground pin of the IEC detachable ground cord and the thumb screw meets the requirements as outlined on drawing A03387(see Apnd. A).

Measuring Leakage Current

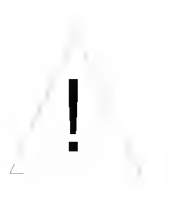
To check the Chassis Leakage Current:

1. Connect the light source to a leakage tester (refer to figure 5-1), and measure leakage current on leakage meter. Ensure that leakage is less than 100 microamperes.

2. Open ground line, and ensure leakage current is less than 100 microamperes.

3. Reverse line polarity, and ensure that leakage current is less than 100 microamperes.

4. With reversed polarity, open ground line and ensure leakage is less than 100 microamperes.

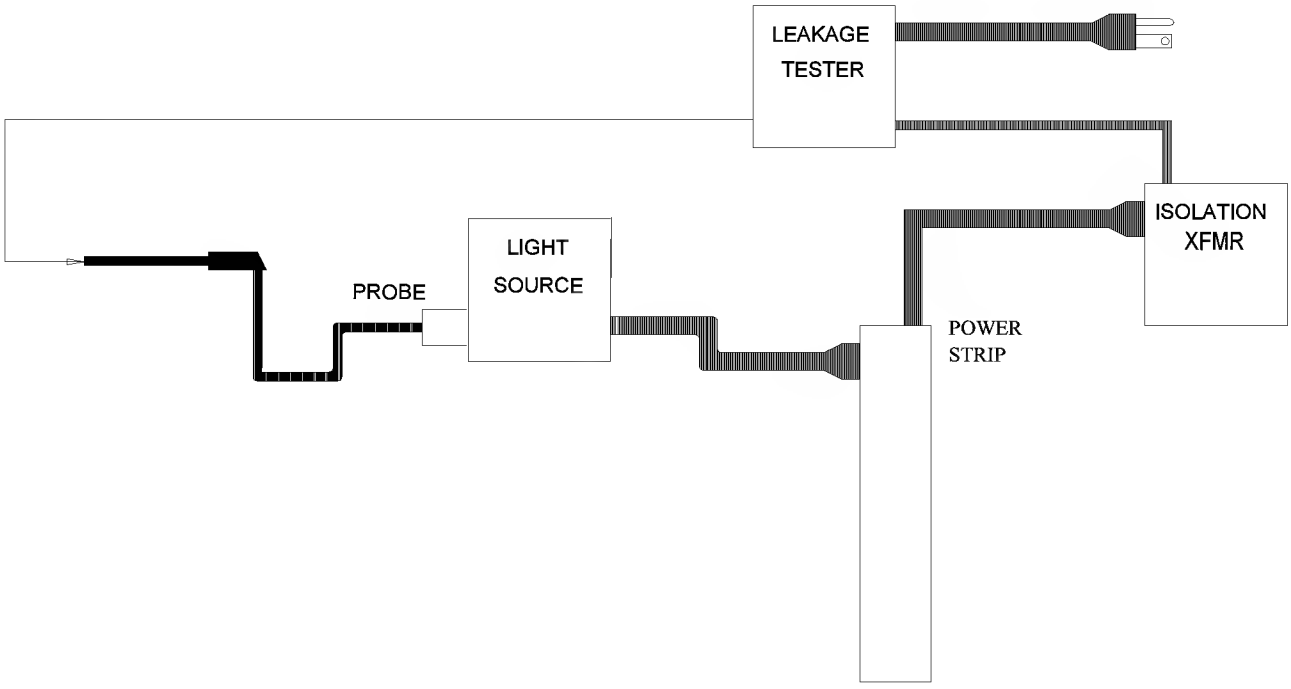


CAUTION: The meter must be suitably insulated and capable of withstanding the power line voltage.

LEAKAGE CURRENT TEST SET-UP

When the light source is used in conjunction with other accessories, it may be necessary to measure the leakage current level of the entire set-up. A typical system setup is shown in Figure 5-1. Using a standard leakage tester, this set-up will allow the overall system leakage current to be measured. If this value exceeds 100 microamps (or whatever the maximum requirements are for a particular region), an isolation transformer should be used.

Figure 5-1: Typical Current Leakage Test Set-Up



FUSE REPLACEMENT

1. Turn the power switch OFF and disconnect the power cord from the light source.
2. Open fuse drawer located as part of the power cord receptacle.
3. Remove fuse by pulling it out firmly.
4. Check fuse condition. Replace if blown. Replacement fuse: 250V, 1.0 Amps. 5 x 20mm , Slow-Blow. ***Use WA fuse only! An unqualified fuse may fail prematurely.***
5. This system has two fuses. Be certain to check the condition of both fuses.

LAMP REPLACEMENT

Refer to users manual 496027 or 496130 for full detail.

1. Turn the power switch OFF and disconnect the power cord from the light source.
2. Wait a minimum of 5 minutes to allow the lamp to cool.
3. Remove the lamp cover on the bottom of the Light Source by unscrewing the thumb screw on the bottom of the light source.

   NOTE: Removing the cover will automatically cut off power to the Light Source.
4. Loosen the thumb screw that holds the metal bracket in place over the Lamp Assy.
5. With the metal bracket up out of the way, remove the lamp assembly by pulling straight up.
6. Acquire new replacement lamp assembly.
7. Reseat the new lamp assembly. It will make a "click" sound when fully seated.
8. Slide the black connector on to lamp, and secure the metal bracket that holds the lamp assembly in place.
   Note: Route wires to the sides of the metal bracket, not under it. See the picture on the inside of the lamp cover.
9. Secure the lamp cover, reconnect the system, and verify lamp operation.

Section

6

Theory of Operation

Introduction

SFI Light Source:

Model # 49601 is a *medical light source* which is used in conjunction with the Welch Allyn single fiber Luminaire. The light source is comprised of a power supply, a ballast, and an Arc-Lamp. The light generated by the Arc-Lamp is focused into a small single point by using two reflectors. The reflectors and the lamp are optically aligned at the factory; therefore, there is no repair to these subassemblies.

SFI Luminaire:

Model # 49610 Cogent Luminaire, designed and assembled by Cogent Light Technologies, is designed to work with the SFI light source and single fiber optic cable. The Luminaire utilizes a series of adjustable lenses to focus the light into a spot of diameter of 25mm-77mm at a distance of 16in.. The joystick assembly is the only replaceable part on the Luminaire.

Single Fiber Cable:

The Welch Allyn Single Fiber Optic Cable is a lightweight quartz glass fiber within a Teflon and silicone jacket. The fiber-optic cable has approximately 11 feet of useable length from the light source to the Luminaire. There are no repairable parts on this component of the SFI system.

Start up Routine (Lamp Ignition)

Upon turning the power switch to the "ON" position, the lamp ballast will ignite the lamps for an approximate warm-up phase of 15 seconds. Once this warm-up phase is complete, the the lamps will be warmed up, and the system will be ready for use.

Note: The fiber bundle must be in place to stabilize light output. Do not toggle the power switch ON and OFF. Doing so will dramatically shorten lamp life.

Power Supply

UNIVERSAL INPUT, SWITCHING AC TO DC MEDICAL GRADE POWER SUPPLY

The power supply accepts an input voltage of 100-240 VAC, 50-60 Hz, single phase. The primary circuit provides adequate control of leakage current, which is limited to 35 microamperes maximum. The primary side of the power supply rectifies the AC voltage and converts it to a high voltage DC level. This DC voltage is connected to the isolation transformer through a switching device, typically a mosfet. The mosfet is triggered by a high frequency clock circuit, typically at a 30-50 KHz rate. The secondary side of this transformer provides isolation between primary and secondary circuits. The secondary voltage is rectified and filtered to provide a +15 VDC output voltage at 5.3 amps. The output voltage is regulated to 2%, with peak-to-peak noise of 150mV. The output is fully protected against short circuit and output overload. Short circuit protection is a cycling type power limit with automatic recovery after fault.

Ballast Board

The ballast board is a power supply used to operate the 24 watt Welch Allyn miniature arc lamp. The nature of arc lamps require a ballast which limits the current, and therefore the power, in the lamp. There are three states of the operation of the ballast: ignition, warm-up, and steady state. In ignition the ballast provides the lamp with a train of ignition pulses between 6 and 7 kV. Once the lamp is ignited the ballast conducts current at a very low impedance, which constitutes the warm-up phase. Once it warms up, the impedance changes to a higher steady state value. The ballast board also controls the Bulb Replacement indicator located directly next to the attenuator control. This lamp will light when the output voltage to the lamp exceeds 61.5VDC, which is an indication that the Arc Lamp is going to or has failed.

Part Number	Description	Bubble #	Start up order Qty
761076-0	POWER CORD, DETACH.(DOM/JAPAN)	NA	2
761076-2	POWER CORD, DETACH. (EUROPE)	NA	2
761076-4	POWER CORD, DETACH. (U.K.)	NA	2
761076-6	POWER CORD, DETACH. (AUSTRALIA)	NA	2
496017-1	LABEL NAMEPLATE - DOMESTIC (USA)	NA	5
496017-2	LABEL NAMEPLATE - INTERNATIONAL	NA	5
496028-501	CARTON ASSY, COG LT BOX	NA	5
496002-1	BOTTOM, LIGHT BOX (COATED)	1	1
496071	AIR FILTER	2	5
496080	INTERLOCK SWITCH	3	1
496081-501	HARNESS ASSY (SWITCH)	5	5
495074	INSULATING PLATE	6	10
451534	SCREW PHP #4-40 X1.0	7	10
106124-1	PLASTITE PAN HEAD SCREW	9	10
455508	LABEL, PROTECTIVE EARTH GROUND	10	5
106106-7	GROUND LOCK WASHER	11	10
106105-4	SPLIT RING WASHER	12	10
106109-9	NUT	13	10
495075	BALLAST SIDE CONN ASSY C12A003	16	5
496025	INSULATOR, BALLAST	17	5
495068	BALLAST 24W UNREGULATED	19	5
106124-34	#4 X.375 PLASTITE PHPS	21	10
496131-501	HARNESS ASSY (LED)	22	5
106132-3	4-40 X 1	23	10

Part Number	Description	Bubble #	Start up order Qty
106106-2	#4 INTRNL TOOTH LOCKWASHER	24	10
495067	FAN GUARD	25	0
496093	FAN MOUNTING RING	26	0
496062-504	HARNESS ASSY, FAN	27	5
496124	FAN NUT PLATE	28	0
106105-3	#4 LOCKWASHER,HEL	29	10
790043	4-40 X .250 HEX NUT	30	10
106132-5	4-40 X .750 PH TR MS SS	31	10
880031	POWER SUPPLY 40 WATT	32	5
496026	INSULATOR, POWER SUPPLY	33	10
106144-4	BEARING, NYLINER	34	2
496005	KNOB, COGENT LT BOX	35	2
496075	WASHER, ATTENUATOR KNOB	36	2
496068	BOWED WASHER	37	2
496023	GEAR,KNOB COGENT LT BOX	38	2
106101-18	RETAINING RING	39	2
496024-501	PLATFORM PKGD	40	1
106124-25	#8 X 1.00 PLASTITE SCREW	41	10
106100-11	PHPS 4-40 X.312	43	10
496076-501	SHAFT ASSY, GEAR/ATTENUATOR	48	1
106101-17	RETAINING RING	49	6
496077	ATTENUATOR FLAG ASSY	50	1
106103-38	WASHER, PIVOT	51	10

Part Number	Description	Bubble #	Start up order Qty
488308-4	Cable Clamp	53	20
M11047	Thermal Compound #120-5	54	N/A
713104	6-32 X .186 Phph	56	10
761077-1	Tie Wrap	57	50
106103-37	Pivot Washer	55	5
106100-46	10-32 X .25 Screw	58	10
106124-9	Screw	60	10
496123	IEC Power Filter	63	0
106100-42	4-40 X .25 Screw	64	10
236706-3117	Fuse	65	20
236733	Fuse Drawer	66	1
106120-4	6-32 X .750 Screw	70	10
496033	Lamp Access Door Knob	71	0
09600-501	Fixtured Lamp Package	76	3
495083	Rubber Feet	77	0
M30373	Loctite 425	78	0
47143	Fiber Optic Cable (304.8cm)	NA	20
49571	Joystick Assembly (Post on Luminaire.)	NA	10

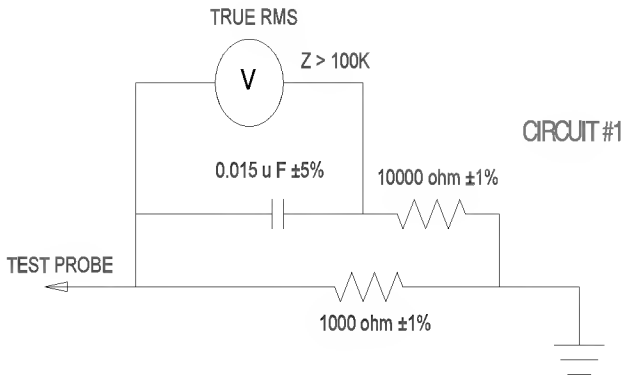
AT THE CONCLUSION OF MANUFACTURE AND BEFORE SHIPMENT, EACH HI-LUX LIGHT SOURCE SHALL SUBJECTED TO THE FOLLOWING TESTS:

1 -GROUND CONTINUITY BETWEEN GROUND PIN OF IEC DETACHABLE LINE CORD AND THUMB SHALL NOT EXCEED 0.2 OHM. A CURRENT OF 1 AMP FROM A CURRENT SOURCE WITH A NO-LOAD VOLTAGE NOT EXCEEDING 6 VOLTS WILL BE PASSED BETWEEN THEM FOR AT LEAST 5 SECONDS AND THE RESISTANCE CALCULATED FROM THE CURRENT AND THIS VOLTAGE DROP.

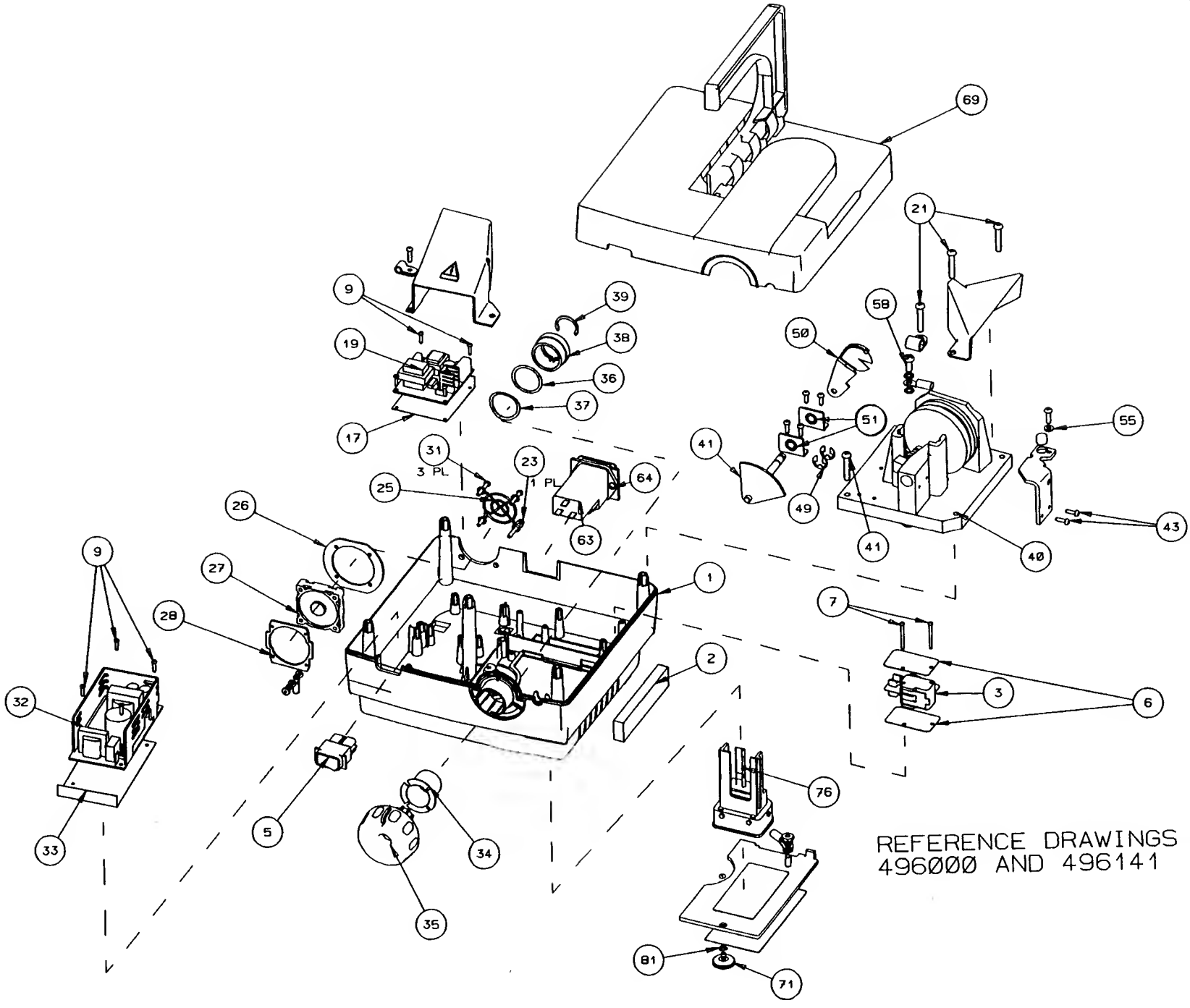
2 -THE LEAKAGE CURRENT MEASURED FROM ANY EXPOSED METAL PARTS (THUMB SCREW) TO WITH AN INPUT VOLTAGE OF 240V, 50HZ AND THE GROUND WIRES SECURELY CONNECTED SHALL NOT EXCEED 100 MICROAMPS (CIRCUIT #1 BELOW).

(B) 3 - A DIELECTRIC STRENGTH TEST OF 1500 VAC FOR 1 SECOND BETWEEN PRIMARY WIRING (BOTH SIDES OF SUPPLY TERMINALS CONNECTED TOGETHER) AND ACCESSIBLE DEAD METAL PARTS (THUMB SCREW).

4 - IF ANY OF THE TOLERANCES HAVE BEEN EXCEEDED, THE UNIT SHALL BE REJECTED.



Reference Drawing #A03569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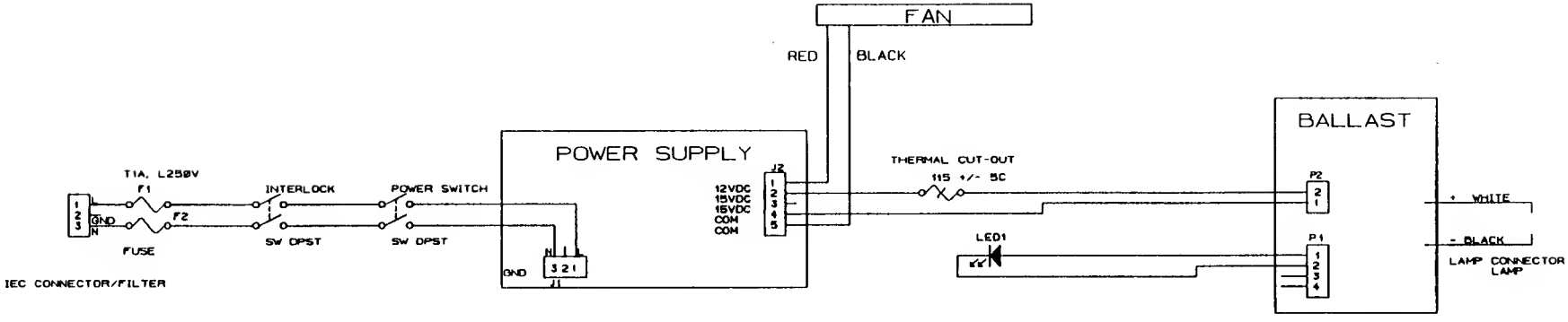
REFERENCE DRAWINGS
496000 AND 496141



REFERENCE DRAWING #496045